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PROBLEMS OF LIVESTOCK RESEARCH IN AFRICA

(item 12 of the Provisional Agenda)

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INTRODUCTION

1. Inspite of the harsh environmental conditions imposed by the climate and the attendant disease and forage production problems, it is generally agreed that Africa has an enormous potential for improvement in her livestock development. Efforts however to improve production do not appear to have yielded dividends over all. Among the many reasons for this are the lack of the understanding and proper knowledge of the interactions that militate against progress and socio-economic factors that make producers pursue old methods and raise stocks that seem to give little or no returns for their efforts.

2. An outstanding attraction for livestock research in Africa either in production or health is the abundance of not only interesting but economically important and urgent problems. Though some centers for livestock production and improvement including disease control existed, it was the great Rinderpest panzootic of 1896 - that marked the beginning of serious investigations into livestock problems mostly disease control in many countries of the continent. Efforts in fodder production improved husbandry and breeding were to start much latter.

3. However in the past fifty years, more so in the past twenty years, increasing efforts have been made in the field of livestock research in Africa. These efforts have focused mostly on cattle, at first on preventing deaths from the major epizootic diseases such as rinderpest, anthrax, trypanosomiasis, haemorrhagic septicaemia and contagious bovine pleuropneumonia (CBPP); then on fodder production, and improving cattle production by upgrading. In recent years attention has focussed on the socio-economic parameters which influence cattle produciton by pastoralists. While pigs and poultry have received some attention in adaptative or applied research, sheep and goats have received comparatively less attention. The contribution of sheep and goats to national diets, and sheep in particular to the export earnings of some countries are however considerable. In the highlands and the Sahel, the donkey and the horse and in desert areas, the camel play very important roles of transporting man, his farm produce and merchandise, and contribute immensely to the economic activities of these regions, yet these three animals hardly receive any attention or mention in the research efforts of some of the countries who use their services. The exception being trypanosomiasis in camels. Other meat animals like the rabbit, the giant snail (Acatina acatina) etc., hardly receive any attention.

A. LIVESTOCK RESEARCH ORGANIZATION

4. Research on Livestock in Africa is carried out by a number of organizations, sometimes two or more in a given country. A recent FAO seminar on Agricultural Research organization and management in Africa (FAO 1981) identified three typical groups of Agricultural Research organizations namely:

- 1. Research sponsored by a Ministry;
- 2. Research sponsored by an antonomous or semi-antonomous (government) institution;
- 3. Other types of (government) organizations.

5. Livestock research is similarly organized. There are also three International organizations namely: the International Livestock Centre for Africa (ILCA), the International Laboratory for Research on Animal Diseases (ILRAD), and the International Centre for Insect Physiology and Ecology (ICIPE) which carry out research on aspects of livestock production in Africa.

(i) Research sponsored by a Ministry

6. Many countries have one or more ministries whose responsibilities include either all or some aspects of livestock research. These ministries include:

(a) The Ministry of livestock Development or Animal Resources - e.g., Somalia, Kenya and Tanzania;

(b) The Ministry of Agriculture, e.g., Kenya, Egypt and Zimbabwe;

(c) The Ministry of Higher Education or Ministry of Higher Education and Scientific Research - e.g., Senegal;

(d) Ministry of Rural Development - e.g., Togo and Upper Volta;

(e) Ministry of Science and Technology - e.g., Nigeria;

(f) General Delegation for Scientific and Technical Research - e.g., Cameroon;

(g) Ministry of Scientific Research - e.g., Ivory Coast.

(ii) Antonomous (Government) agencies

(a) In Ghana, the Animal Research Institute (ARI) is under the Council for Scientific and Industrial Research (CSIR) which is under the National Council for Higher Education (NCHE) an antonomous Council answerable directly to the Office of Head of State;

(b) In Ethiopia, the Institute of Agricultural Research is responsible for livestock research as well;

(c) In Burundi, the Institut des Science Agronomiques du Burundi (ISAPU) is organized in five technical departments including Animal Production.

(iii) Semi-anatonomous research organizations

7. In Tanzania Livestock research comes under a number of semi-antonomous organizations co-ordinated by the Ministry of Livestock Development. The main one is the Tanzania Livestock Research Organization (TALRO), some of the others are the Tanzania Pesticide Research Institute (TAPRI) and the Uvole Agricultural Centre at Mbeya.

8. In Egypt - Research is undertaken by the Animal Production Research Institute and the Animal Health Research Institute as part of the semi-antonomous authority, The Animal Research Centre, under the Ministry of Agriculture.

(iv) Universities

9. Departments of Animal Science or Animal Production in the Faculties of Agriculture and Departments within veterinary Faculties in the Universities carry out research on aspects of Livestock production and health.

10. In some countries while the Veterinary services carry out research through their laboratories on disease problems, the Departments of Agriculture and Animal production carry out research on pasture development animal production and breeding.

(v) International research centres

11. There are three International Research Centres, also undertaking research on livestock problems. These are :

(a) The International Livestock Centre for Africa (ILCA) with its headquarters at Addis Ababa and field stations in Ethiopia, Botswana, Kenya, Mali and Nigeria;

(b) The International Research Laboratory on Animal Diseases (ILRAD) at Kabete in Kenya;

(c) The International Centre for Insect Physiology and Ecology (ICIPE) in Nairobi, Kenya.

(vi) Other livestock research activities

12. These include bilateral research activities, carried out by international organizations such as the Institut d'Elevage et de Medecine veterinaire des pays Tropicaux (IEMVT) the Gesselschaft fur Technische Zusammarbeit (GTZ), the Food and Agricultural Organization of UN (FAO), the Office dela Recherche Scientifique et Technique Outre-Mer (ORSTOM), in a number of countries usually in the national research centres or centres created for the purpose. Some of these centres are:

(a) The animal trypanosomiasis research centre at Bobo-Dioulasso, Upper Volta

13. The laboratory is fully financed by the French Delegation generale a la Recherche Scientifique et technique (GRST) for IEMVT to conduct (a) field research on the eradication of tse-tse fly (glossina) using the sterile insect technique and (b) study the genetic transmission and induction of trypanotolerance. IEMVT is collaborating with GTZ at this facility.

(b) Centre de Recherches zootechniques (CRZ) Ivory Coast

14. (Animal Husbandry Research Centre) - Bouake - Minankro, Ivory Coast - now integrated into the Institut des Savanes of the Ministry of Scientific Research, was originally started by IEMVT which still has staff there. This centre among other topics studies sheep and goat rearing methods.

(c) The Farcha Laboratoire de Recherches Veterinaires et Zootechniques

(Animal Husbandry and Veterinary Research Laboratory at N'Djamena, Chad, produces vaccines against major epizootic diseases such as rinderpest and contagious bovine pleuropneumonia (CBPP). It is currently concentrating on small ruminants (production and diseases) and agropastoralism. It is managed by IEMVT. The IEMVT has research workers working on programmes at :

(i) The National Veterinary Institute of Debre Zeit, Ethiopia. This centre produces all the vaccine requirements of Ethiopia and is researching on Foot and Mouth Disease Vaccine;

(ii) The Laboratoire National de L'elevage et de Recherches Veterinaires

(National Laboratory for Animal Production and Veterinary Research) Dakar-Hann, Senegal, Research includes vaccine production, animal nutrition, animal husbandry and pasture studies;

(iii) The laboratoire D'elevage at Niamey in Niger which focuses on diseases of sheep and goats and Sahelian agropastoralism;

(iv) The stations de Recherches (Research Stations) at Wakwa and Banbui in the Cameroon - work on improvement of local zebus and the cross breeding of these with the Brahman, Montbeliard and the Holstein, Rangeland management, stock fattening and dairy production are also studied;

(v) The Laboratoire National de Production de Vaccines Veterinaires

(National Veterinary Vaccine Production Laboratory) at Rabat, in Morocco.

15. The GTZ has research facilities at Avetonu in Togo where work on trypanotolerance is among the activities on-going there.

16. The Wellcome Foundation has facilities at Kabete near Nairobi - Kenya devoted to Foot and Mouth diseases (FMD), and East Coast Fever (ECF) studies. These are concerned with vaccine and chemotherapy respectively.

The Food and Agricultural Organization of the United Nations (FAO)

17. The FAO is a co-sponsor with the World Bank and the UNDP of the Consultative Group on International Agricultural Research (CGIAR) which sponsors IICA and ILRAD.

18. The FAO also provides technical assistance and equipment to national livestock research institutes or centres on specific problem oriented research, such as sheep research at the Ethiopian Livestock Research Institute; research into vaccine production at the Veterinary Laboratories at Mogadiscio, Somalia; Sheep and Goat Research in Kenya and the Integrated National beef cattle research programme in Botswana. The FAO is involved in investigations into the use of agro-industrial by-products as animal feeds first at the University of Ife, Nigeria, and the Institut de recherches zootechnique at Bambui Station in Cameroon, and is now sponsoring an African wide studies net-work together with ILCA in the feeding of agricultural by-products. FAO also awards research contracts on specific research problems as well as train research workers through fellowships. The FAO is involved with the control of a number of diseases including rinderpest CBPP, trypanosomiasis, ticks and tick borne diseases.

19. The Inter-African Bureau for Animal Resources (IBAR) of the Scientific and Technical Research Commission (STRC) of OAU is also involved in the co-ordination of livestock disease control efforts on an African regional basis and works in close collaboration with national veterinary services and the International Agencies such as FAO, ILCA, ILRAD and OIE.

20. The World Health Organization (WHO) includes African trypanosomiasis as one of the six diseases covered under its special Programme for Research and training in Tropical diseases and collaborates with both the FAO and ILRAD.

B. RESEARCH COVERAGE AND SCOPE

21. As it has not been possible to visit national laboratories to study the coverage, depth, scope and direction of on-going research, it is not possible to give a detailed account on this subject.

22. Nevertheless, livestock research in most of the national research organizations falls under three broad categories namely:

(a) Animal Health;

(b) Animal Production; and

(c) Socio-economic studies.

Research in animal health

23. This is undertaken in Veterinary laboratories, research institutes and in various departments of the Faculties of Veterinary Medicine and in departments of Animal Science of Faculties of Agriculture. There are now some 19 veterinary faculties in Africa.

24. Laboratories now exist that produce vaccines against rinderpest, anthrax, (CBPP), blackleg, blackquarter, pasteurellosis, lumpy skin diseases, rabies, fowl pox, Newcastle disease and foot and mouth disease.

25. A number of countries do not have operational laboratories, while others have facilities for only simple bacterial diagnoses. Very few of the laboratories are engaged on in depth or basic research. Some measure of success has however been achieved as evidenced by a number of laboratories being able to produce vaccines. Some diseases have been difficult to deal with inspite of years of research in a number of laboratories. These include tick-borne-diseases such as, the theilerial diseases of which East Coast fever is an important one in East and Central Africa. Another important disease being investigated is the tsetse transmitted trypanosomiasis. The control of the vectors of both diseases have been difficult. Other diseases that have defied control and require serious research in Africa include most of the poultry diseases such as Marek's disease, cumboro disease, infectious bronchitis, Newcastle disease, and infectious rhinotracheitis. Streptothricosis, demodicosis, foot and mouth disease, African swine fever, peste des petits ruminants, bluetongue, caprine pleuropneumonia, and the mycoplasmosis are all receiving research attention and are yet to be controlled so also Nairobi sheep disease and Rift Valley fever.

Research on animal production

26. Research is mostly on cattle and to some extent on sheep. Studies include genetics; breeding for meat and milk by cross breeding, mostly with exotic animals and the use of artificial insemination; animal nutrition; use of agro-industrial by-products as animal feeds; pasture and fodder studies and animal husbandry systems. Animal physiology, (including reproduction, adaptation and water requirements); socio-economics and agro-pastoralism are also being studied.

27. The goat, donkey, camels and horses do not receive the attention they deserve.

28. Studies have focused mostly on the arid and semi-arid areas in West Africa and on the highlands and rangelands of East Africa and the veld in Southern Africa. In recent years some attention is focusing on the small ruminants in the humid and sub-humid zones of West Africa. Interest in trypanotolerant cattle, sheep and to some extent goats is now developing.

29. Departments of Agricultural Economics and Institutes of Social Statistical and Economic Research also study livestock marketing, socio-economics and pastoralism.

30. The Food and Agricultural Organization has also commissioned a number of studies into aspects of livestock production, marketing socio-economics of livestock raising and pastoralism. ORSTOM, IEMVT and the Societe d'Etude Developpment Economique et Sociale (SEDES) carry out socio-economic studies of livestock marketing and pre-investment or development feasibility studies in a number of Francophone and a few Anglophone countries.

C. CONSTRAINTS ON LIVESTOCK RESEARCH

31. Though major breakthroughs have been made in the improvement of vaccines and diagnostic techniques; better understanding of feed values, improved breeds; and though results of research elsewhere outside Africa could be and are being adapted for use in Africa, the application of such results to the improvement of livestock production in Africa has only been modest.

32. Constraints on livestock research in Africa are many. A FAO Conference on Agricultural Research (FAO 1975) identified four major constraints namely:

(a) Lack of recognition of the importance of research in national development plans, with consequent lack of investment in research development and insufficient long-term financial support;

(b) Agricultural research is often under-valued in external assistance programmes for agricultural and rural development. More particularly, external assistance seldom provides the long-term financial support required to build up viable and effective research structures and programmes.

(c) Shortage of well-trained and experienced research workers in developing countries. This accompanied by insufficient incentives and career prospects to encourage well-trained personnel to work in research, instead of favouring other assignments in governmental administration, the private sector, and employment abroad;

(d) A widespread weakness in the planning, organization, management, evaluation and co-ordination of research programmes, and serious gaps in linkages between research extension and the farming community.

33. To these may be added:-

(i) Lack of co-ordination as a result of conflict of direction and control of government agencies undertaking the same activities. (Cooper 1970).

(ii) Frequent structural changes in organizations and also in personnel; and

(iii) for some countries lack of stability.

34. It may not be true today to say that all countries in Africa do not recognise the importance of livestock research. What is true however is that not enough funds are made available for it. This however is one of the main problems.

Because of inadequate funds, most national researchers carry out short ad hoc investigations that may not require expensive equipment or chemicals or large numbers of animals. The results of such investigations however may not necessarily be transferable to the field.

35. Livestock research of a necessity is long term, both time and funds consuming and for anyone who wants to see results with his investments or aid money, research with uncertain results is not the area to invest in, hence the cautious support from both national governments and external assistance programmes. It has been observed that in the developing countries with a few exceptions the agricultural sectors are supported by research expenditures in the order of less than 0.5 per cent of agricultural gross domestic product (FAO 1981). External aid goes into livestock research in Africa either directly to national and international institutions or indirectly as part of projects and training programmes.

36. A number of national livestock research centres and laboratories and university faculties of agriculture and veterinary medicine and biological sciences lack up to-date equipment and are often littered with broken or obsolete equipment. Results naturally from such organisations will not be forthcoming.

37. Poor remuneration and working conditions in national research institutes resulting from inadequate funding, frustrate research workers. There are a number of countries where top national scientists and researchers do not earn $US 500.00 a month. This does not encourage trained personnel to return or those on the job to remain.

38. There are now a number of institutions of higher learning which are increasingly turning out graduates. There are also university postgraduate schools turning out higher qualified personnel. Research institutes both within Africa and higher institutes overseas with the help of external funding agencies are also training African scientists. The numbers however are not enough. The total number of research scientists in sub-Saharn Africa was estimated to be 2,970 in 1980 (Oram 1981). The share in livestock production is very low.

39. It is imperative that the rate of training of African Scientist to undertake research on livestock problems be accelerated. They also need to be involved in both national and international research organisations since it is on their shoulders that the problems must lie.

D. EFFECTIVENESS OF LIVESTOCK RESEARCH

40. The effectiveness of livestock research may be measured in terms of the adaptation of the results by livestock producers to make a positive impact on livestock productivity. Effective results have been obtained in the use of a number of vaccines. The fact that the diseases still plague livestock is because they are not been used as they should. On the otherhand the control measures found for vectors such as the glossina species and ticks are expensive, time consuming and in some cases ecologically distructive. Work is still in progress to find better methods.

41. In the field of animal production some measure of positive results have been achieved in improvement of husbandry practices, forage and pasture production, nutrition and artificial insemination. Their application on a large scale however seems to be negligible especially by small holders, pastoralists and agro-pastoralists. The commercial farmers have used the results of research in these areas including animal breeding developed both within the continent and elsewhere. If the effectiveness of research is to be judged by the impact of its results on the majority of livestock producers then, there has not been much in these areas.

42. The fault in this case does not lie wholly with the researchers but with the agencies responsible for getting the producers to adopt the innovations.

43. The constraints for the adoption of research results include, lack of credit to purchase inputs to improve facilities; problems of land tenure, processing and marketing. Sometimes too the methods advocated are too sophisticated and expensive to be applied by the small holder agro-pastoralists or inappropriate for the pastoralist who is constantly on the move. Another constraint is the failure of industry to step in to produce at reasonable cost some of the innovations advocated.

44. The area of Socio-economic studies of livestock production is relatively new so also the systems approach. They require time to show results.

E. THE ROLE OF INTERNATIONAL ORGANIZATIONS AND RESEARCH CENTRES, INTERGOVERNMENTAL BODIES, SUBREGIONAL ORGANIZATIONS AND ASSOCIATIONS

45. There are a large number of organizations, aside from the national livestock research organizations, involved either directly or indirectly in research on African livestock problems. These include:

International organizations, some of which are:

(a) The Institute d'Elevage et de Medicine Veterinaire des pays Tropicaux (IEMVT) France

(b) The Ministry of Co operation Republic of France (MCRF),

(c) Office de la Recherche Scientifique et Technique Outre Mer ORSTOM-France,

(d) Societe d'Etude Developpement Economique et Sociale (SEDES), France,

(e) Overseas Development Institute, United Kingdom,

(f) Gesellschaft fur Technische Zusammenarbeit (GTZ), (Agency for Technical Co operation, Federal Republic of Germany),

(g) International Development Research Centre (IDRC) Canada,

(h) International Service for National Agricultural Research (ISNAR), Netherlands,

(i) United States Agency for International Development (USAID), United States of America,

(j) Co operation for Development in Africa formed by the seven principal bilateral donors to Africa and many others,

46. The International organizations operate by:

(a) Channelling research funds through other agencies - such as the Ministry of Co-operation of France which provides funds through the IEMVT for the prosecution of small scale specific research projects such as:

(i) Building of a Laboratory in Chad for the production of vaccines against rinderpest and CBPP,

(ii) Provision of facilities and personnel for research on trypanosomiasis and poultry diseases in Upper Volta

(b) Providing funds for technical assistance with equipment and recruitment of their national research scientists. E.g., MCRF either through IEMVT in Debre Zeit (Ethiopia), Dakar (Senegal), and Niamey (Niger) or directly to Nouakchott (Mauritania).

(c) By co-operating with each other in providing technical assistance towards specific research such as the GTZ, and IEMVT on Trypanosomiasis and Trypanotolerance studies in Upper Volta pastoralists studies in Senegal by funds provided by MCRF, GTZ and USAID; assistance to the veterinary and livestock research Centre at Avetonou in Togo by the IEMVT and GTZ.

(d) The attachment of research scientists to operate or help operate research centres such as IEMVT scientists at Bouake - Minankro, in Ivory Coast, N'Djamena in Chad.

(e) Work on specific research programmes e.g., IEMVT scientists at the National Veterinary Institute at Debre Zeit, Addis Ababa National laboratory for Animal production and Veterinary research at Dakar Hann, Senegal; Niamey in Niger and research stations at Wakwa and Bamburi in Cameroon. ORSTOM also has research scientists in various universities in Mauritania, Senegal, Ivory Coast, Togo, Cameroon, Upper Volta, Niger, Central African Republic, Congo, Rwanda and Kenya.

(f) The international organizations also provide assistance to specific opera tions which are either entirely research oriented or indirectly have research implications such as IEMVT advisers to laboratories in Nouakchott, Mauritania and Bingerville in Ivory Coast building a research laboratory in the Cameroons, rangeland utiliza tion trials in Niger and large scale animal production schemes in North Ivory Coast through sending support teams.

(g) Pre investment studies are also carried out such as those by SEDES.

(h) Some of the international organizations do not themselves carry out research but assist in funding research projects either directly (IDRC) or indirectly (USAID) and Training of Research Staff either informally at seminars (IDRC) or formally at Universities, (USAID, ODA and British Council etc). Training is also provided by IEMVT and ORSTOM, in their institutions.

(i) Some of the international organizations also fund research projects at national and international research institutes such as the IDRC and Ford Foundation to University Departments and ILCA.

47. Several overseas governments provide bilateral aid to African governments to help in their livestock research and development programmes. Denmark has provided major assistance for the construction of cattle dips in Eastern Africa, Federal Republic of Germany supports research on chemotherapy and tse tse control, Belgium and the Netherlands contribute to the development of national laboratory facilities for improved diagnosis of livestock diseases and the USA has made major contributions to several trypanosomiasis control projects.

48. There are a number of overseas research centres and institutions which carry out research in their home laboratories on subjects pertinent to livestock production in Africa. These include

(a) The London School of Tropical Medicine and Hygiene,

(b) The centre for Tropical Veterinary Medicine, Midlothian, University of Edinburgh,

(c) The Centre for Overseas Pest Research, London,

(d) Various Universities in Europe and USA.

The results of such studies are published in the relevant scientific journals.

International Research Organizations

49. There are three International Research Organizations involved with research on livestock problems in Africa viz.

(a) The International Livestock Centre for Africa (ILCA),

(b) The International Laboratory for Research on Animal Diseases (ILRAD), and

(c) The International Centre for Insect Physiology and Ecology (ICIPE).

50. The International Institute for Tropical Agriculture (IITA) at Ibadan in Nigeria, also deals in agronomic studies of legumes and crops that can be used as animal feed.

51. The ILCA and ILRAD as well as IITA are sponsored by the Consultative Group on International Agricultural Research (CGIAR) an international network for agricultural research in the developing countries.

The International Livestock Centre for Africa (ILCA)

52. ILCA with its Headquarters near Addis Ababa was established in 1974. The mandate of ILCA is "To assist national efforts which aim to effect a change in production and marketing systems in tropical Africa so as to increase the sustained yield and output of livestock products and improve the quality of life of the people of this region". In addition, the following more specific terms of reference were set out at the time, (ILCA 1980).

(a) Retrieve, assemble and make available in both English and French all relevant information on animal production in tropical Africa;

(b) Engage a multidisciplinary research staff to study existing animal production systems and to develop new or amended methods of production and define priorities for other research,

(c) Support, supplement and co-operate with existing national and regional research stations or programmes in developing a fully co-ordinated programme of production and rangeland research related to the urgent needs of livestock development,

(d) Develop the capacity to undertake research programmes in specific aspects of livestock production appropriate to an international centre,

(e) Organize or assist in organizing seminars, technical conferences and training courses for staff engaged in livestock research, extension, planning and production, in order particularly to increase regional competence in the interdisciplinary systems approach to livestock research and development,

(f) Make available statistical support, information or advice to national, regional or international authorities in the various fields relating to animal production in which the Centre is actively engaged,

(g) Engage in such other activities as may be found necessary to further the Centre's objectives".

ILCA carries out its mandate through its:

A. Headquarters research and support units and

B. Field programmes.

53. A.1. Headquarters Research Units at Addis Ababa, Ethiopia include:

(i) Livestock policy unit

(ii) Livestock productivity and trypanotolerance group based at ILRAD, Nairobi, Kenya

(iii) Forage Legume Agronomy group

(iv) Nutrition unit

(v) Aerial survey unit

(vi) Cartography unit,

(vii) Computer unit.

Also at headquarters are:

A.2 The Information Services Comprising of:

(i) Library and Documentation Services;

(ii) Publications,

A.3 International Liaison and Training.

A.4 Operations:

(i) Administration

(ii) Finance.

B. The Field Programmes include:

(i) Highlands programme (Ethiopia);

Debre Zeit,

Debre Berhan,

(ii) Arid and Semi Arid Zones programme, Bamako (Mali),

(iii) Sub-humid zone programme, Kaduna (Nigeria),

(iv) Humid zone programme, Ibadan (Nigeria).

B.1 Rangelands programme:

(i) Ethiopia,

(ii) Kenya,

(iii) Botswana.

Livestock research in the field

54. The approach is on livestock systems, based on the farming systems research philosophy which operates in four stages, (ILCA 1982). These are:

(a) Diagnose and understand all components of a given livestock system and identify the constraints to improved livestock production in the system,

(b) Carry out research and design potential improvements aimed at removing the constraints,

(c) Test the designed improvements with interested livestock producers adjusting and making changes as the case may be,

(d) Passing on the successful innovations or improvements to national extension services and for use by other producers and continuous monitoring of same.

55. Most of ILCA's livestock systems work are at stage (ii), that is the basic information on the environmental, technical, economic and social context in which improvements are to be sought have been collected and some constraints identified. Research is on-going or about to start on the different components of the various livestock systems taking into account the other features of the overall system. That is improvements are now being designed.

Library and documentation services

56. ILCA's library has a collection of some 11,000 books, 20,000 items on microfiche including university thesis and unpublished research reports from a number of countries in Africa. There are also some 850 periodicals. The library provides microfiches and photocopies as well as lends out books to anyone requesting the services. In 1982, over 30,000 photocopies and 21,000 microfiches were made available to workers within and out side ILCA, (ILCA 1982).

Training

57. ILCA organizes workshops and seminars through its field teams and headquarters Training Section for research workers. The topics include pasture and fodder production and evaluation techniques, Arid zone research, small ruminant breed productivity in the tropics, and refresher courses on animal nutrition and forage evaluation techniques. In 1982, some 199 people participated in these seminars and workshops.

58. Two senior visiting African Scientists spent their sabbatical leave one working on animal breeding data with the highlands programme while the other worked on soil/plant/animal/mineral relationship. Eleven trainees worked as short or long term fellows while five ILCA staff members received in service training at colleges and universities abroad.

ILCA staff also acted as external examiners and post graduate supervisors at the Alemaya College of Agriculture of the University of Addis Ababa, (ILCA 1983).

Co operation with governments and institutions

59. ILCA co-operates with ministries and research institutions dealing with livestock production and research in the countries in which it has field programmes.

60. ILCA has organized a joint workshop with the Association for the Advancement of Agricultural Sciences in Africa (AAASA) at which the African Research network on Agricultural by-products was formed with the FAO and AAASA.

61. ILCA is co-operating with the Plant Genetic Resource Centre of Ethiopia in the collection, storage and dissemination of forage germplasm, and has a close working relationship with ILRAD with whom they reciprocate as observers at each others Board of Directors/Trustees meetings. They also have a close link with the IDRC regional office in Nairobi and FAO. ILCA staff have produced a "Joint network training mannual, livestock productivity and trypanotolerance", with ILRAD and ICIPE staff.

62. ILCA has held two workshops in the past with "Leaders of Animal Production in Africa", to both acquaint the participants of ILCA's research programmes and methodology and find out in return the views of the participants on the subject. The participants have been directors of veterinary and animal research and heads of departments of animal production and Deans of Faculties of Agriculture.

63. In 1982, ILCA created a livestock policy unit with the following objectives:

(a) To identify the critical policy issues for livestock development in Africa,

(b) To analyze past or present policies of African governments as well as to a lesser extent, those of international organizations.

Board of Trustees

64. The research programme at ILCA is guided by an international Board of Trustees. Current Board members come from the United States of America (1)(Chairman):

West Germany	1	Ethiopia	2
United Kingdom	1	Mali	1
France	1	Zimbabwe	1
Norway	1	Nigeria	1
Switzerland	1	Senegal	1

Director of ILCA (Newzealand).

Financial support

65. ILCA currently derives its financial support from The African Development Bank, Australia, Belgium, Denmark, France, Federal Republic of Germany, India, The International Development Association (World Bank), International Fund for Agricultural Development, Ireland, Italy, Netherlands, Nigeria, Norway, Sweden, Switzerland, United Kingdom and United States of America. It also has special grants from Belgium,

Botswana, Ethiopia, Ford Foundation. The International Development Research Centre (IDRC), Kenya, Nigeria and, the Office de Developpement de la Region de Mopti (ODEM) Mali.

II. The International Laboratory for Research on Animal Diseases (ILRAD)

ILRAD's Objective

66. ILRAD's goal is to develop effective control measures for livestock diseases which seriously limit world food production. Trypanosomiasis was chosen as the original focus of ILRAD's research, along with East Coast Fever (ECF) and ILRAD's aim is to concentrate on only these two diseases until at least one of them is satisfactorily concluded. The main focus is to develop vaccines which will be an effective, safe and inexpensive way to control the two diseases, (ILCA 1982).

67. ILRAD carries out its research activities at its modern laboratories at Kabete near Nairobi. It also has a 15,000 hectare ranch at Kaviti near Nairobi with 2,000 head of cattle and also sheep which provide animals for research.

68. Trypanosomiasis is a serious, often fatal disease of man and most domestic and wild animals. The disease occurs in large areas of Africa, Latin America and the Middle East. In Africa the disease is transmitted mainly by the tse tse fly.

69. Trypanosomiasis research at ILRAD is broadly based, covering several aspects of the parasites themselves, as well as the role of tse tse flies in transmitting the disease and the responses to infection of different livestock species and breeds. The goal is to achieve a fuller understanding of the entire disease process in order to identify promising avenues for improved trypanosomiasis control, (ILCA 1982).

70. A major achievements has been the development of methods to maintain live trypanosomes in culture systems in the laboratory outside their tse tse and mammalian hosts. A great deal of research on these parasites is now possible which could not be carried out in the past when they could only be maintained by continuous passage through mammals and tse-tse flies.

71. A second achievement has been the development of improved techniques for separating and categorizing specific trypanosome antigens, including antigen identification using monoclonal antibodies, (ILCA 1982). Scientist at ILRAD have developed batteries of mono clonals which are raised in the laboratory and respond to specific trypanosome antigens.

72. Studies on the tse-tse flies concentrate on their feeding habits and their role in transmitting trypanosomiasis. Tse-tse flies are now raised in ILCA's laboratory, and some of these are available to research centres which ask for them.

73. Work at ILCA includes the response of livestock to trypanosomiasis infection.

74. ILCA is also studying the basis of trypanotolerance in trypanotolerant breeds.

75. A study of trypanosomiasis epidemology is underway at the Kenya coast. This includes comparisons of the susceptibility of local and imported breeds of livestock.

76. ILRAD now has the means of screening trypanocidal drugs in cultures in the laboratory instead of in animals in the field.

77. The production of a vaccine against trypanosomiasis is not yet in site.

78. East Coast fever is a disease that affects cattle, sheep and goats and occurs in high potential farming and grazing areas in Kenya, Tanzania, Uganda, Mozambique, Malawi, Zambia, Rwanda, Burundi and Zaire. Related diseases are widespread in the Sudan, India, Pakistan, Iran and Turkey.

79. ILRAD's research on theileriosis in the laboratory has concentrated on (i) investigating the mechanisms of immunity to ECF in the animal host, (ii) the possibilities of immunization with macroschizonts and sporozoites and (iii) parasite/host relationships in the tick vector, (ILRAD 1983).

80. Field investigations into the epidemiology and control of ECF are being conducted in the Coastal Province of Kenya in co-operation with, ICIPE, the Kenya agricultural Research Institute (KARI), and the Ministry of Livestock Development. The programmes includes:

(a) A survey of the distribution of ECF and the vector tick and isolation of different strains of the parasite.

(b) Immunization trials using two locally selected strains of the parasite, and treatment with oxytetracycline. This has proved successful.

(c) Further field trials are on-going in other areas with the two strains.

81. Attempts are also being made to use antigens of Thieleria sporozoites and schizonts to vaccinate cattle.

82. In addition, to research ILRAD undertakes the training of research scientists and technicians from both Africa and elsewhere. The programmes include individual training activities currently 11 post doctoral and 17 graduate students are working in pursuit of higher degrees or completing their studies at overseas universities with ILRAD's support. These students would have completed their research work at ILRAD. Formal training courses in various laboratory techniques and diagnoses are also offered by ILRAD. A total of 133 people have received training an individual basis and over 600 have attended training courses, seminars and workshops (ILCA 1983).

Collaboration with other agencies

83. International conferences and seminars on subjects pertinent to ILRAD's research activities are organized either alone by ILRAD or jointly with other organizations such as the World Health Organization (WHO) or the Food and Agricultural Organization of the United Nations (FAO) or the International Atomic Energy Agency (IAEA).

84. ILRAD also has close working relationship with both national and international livestock research organizations centred in and around Nairobi and with ILCA. ICIPE, the Kenya Trypanosomiasis Research Institute (KETRI), the Kenya Agricultural Research Institute (KARI), the Welcome Laboratories Kenya, and the Central Veterinary Laboratory at Kabete, have formed the "NAIROBI CLUSTER", an informal association of research scientists dealing with various aspects of the same diseases namely trypanosomiasis and East Coast Fever and their vectors.

85. ILRAD is also collaborating with the Molteno Institute of the University of Cambridge; with the Universite Libre de Bruxelles; the Vrije Universiteit Brussels and the University of Zaire on studies on various aspects of trypanosomes.

86. ILRAD is collaborating with ILCA and the Trypanotolerant Programme in Gambia, and also in Nigeria.

Board of Directors

87. ILRAD carries out its research and training programmes under the guidance of an International Board of Directors. Since its incertion Board members have come from Kenya, Cameroon, Ghana, Nigeria, Senegal, Zaire, Zimbabwe, Australia, Canada, Netherlands, West Germany, the United Kingdom and the United States of America. Current Board members come from:

Kenya	2	Canada	1 (Chairman	Australia	1
Zaire	1	USA	2	Switzerland	1
OAU/IBAR	1	Zimbabwe	1	Ghana	1

The Director: United Kingdom

88. A member of the Board of Trustees of ILCA as well as representatives of donor countries attend as observers at ILRAD's Board meetings.

Staff

89. ILRAD's staff include about 40 scientists, 40 technicians and 260 support personnel from 15 countries.

90. Doubts have been expressed as to the adequacy of Africans within the CGIAR research programmes.

Funds

91. Financial support is from the World Bank, United Nations Development Programme, the Rockefeller Foundation, the Governments of Australia, Belgium, Canada, Federal Republic of Germany, Ireland, the Netherlands, Norway, Sweden, and the United States of America.

The International Centre of Insect Physiology and Ecology (ICIPE)

92. ICIPE carries out its activities at its Headquarters in Nairobi and three field stations at Mbita point, Kadjiado and Mwurumeni in Kenya.

93. ICIPE's mandate is to provide essential background information for the formulation of long range environmentally acceptable integrated pest and vector control measures.

94. The research efforts of ICIPE are concentrated in seven core programmes, two of which are of direct interest to livestock production. These are:

(a) The livestock Ticks Research Programme and

(b) The Tsetse Research Programme.

95. The Livestock ticks programme has been on:

(i) The tick Rhipicephalus appendiculatus the vector of ECF and

(ii) On cattle resistance to ticks. In this programme ICIPE is collaborating with ILRAD and KARI to carry out trials using tick resistant cattle vaccinated against ECF and exposed to challenge in enzootic areas in Western and Coastal provinces of Kenya.

96. The tsetse research programme has been on the ecology, reproductive physiology and trypanosome - vector physiology.

97. The unit has collaborated with the tsetse control unit of the Government of Kenya in evaluating the effectiveness of spraying. Traps for catching tsetse have been developed and improved upon by the unit. Investigations have been aimed at understanding the processes involved in the natural regulation

of the numbers of tsetse of different localities to show why tsetse population densities differ at different localities and what factors govern the fluctuations of these populations (ICIPE 1981).

Training

98. ICIPE's training programmes include:-

(i) ICIPE staff development at the Research and technical levels either in its own laboratories or in overseas institutions;

(ii) Post doctoral research fellowships;

(iii) International postgraduate studies in insect science. This has now developed into the African Regional Post Graduate Programme in Insect Science (ARPPIS) in collaboration with many African Universities. This programme is residential and offers courses leading to the award of the MSC and PHD degrees

(iv) Other training programmes are the International Group Training Course on components Essential for Ecologically Sound Pest and Vector Management Systems. This is a yearly course drawing lecturers and students from Africa, Middle East, Central America, Asia and the Far East.

99. ICIPE holds seminars, workshops as well as conferences to disseminate their research information discuss new scientific advances, review current research and planning of future projects.

100. ICIPE also has a library and documentation service.

Co-operation with other organizations

101. ICIPE exchanges publications with other international research organizations KARI and the University of Nairobi. ICIPE Scientists are in the 'Nairobi Cluster' and have relationships with ILCA and ILRAD. There are guest scientists from a number of research organizations including ORSTOM and the German (West) Academic Exchange programme.

Board of Governors

102. ICIPE has a Governing Board of Seventeen. Three are Kenya government nominees and the rest are Internationally selected.

Funding

103. ICIPE's funds are provided my the SGI which is outside the CGIAR and include th UNDP, FAO, IFAD, World Bank, the OPEC FUND for International Development (OFID), USAID, Australia, Sweden, Norway, Denmark, the Netherlands, France, Switzerland, the Federal Republic of Germany, the United Kingdom, and Belgium as well as Kenya.

INTERGOVERNMENTAL ORGANIZATIONS

The Inter-African bureau for animal resources (IBAR)

104. IBAR is one of the three bureaux of the Scientific Technical and Research Council (STRC) of the Organization of African Unity (OAU). It has its offices in Nairobi.

105. IBAR is a successor of two previous organizations. It started in the late 1950's as a meeting of some Directors of Veterinary Services in Africa and become the Inter-African Bureau for Animal Health in the early 1960's to co-ordinate animal disease activities throughout Africa. In 1969 its mandate was expanded by the OAU to include animal production.

106. IBAR's mandate is to assist OAU member States in the implementation and coordination of their animal disease control programmes and to assist in the improvement of their livestock production systems.

Animal disease control

107. IBAR carries out its mandate in animal disease control by monitoring the animal disease situation reported monthly by the Directors of veterinary services of member States, These are collated and mapped and issued as monthly and yearly reports. When a particular disease is reported from a number of contiguous countries and threatens the livestock industry (e.g. rinderpest and CBPP) it seeks assistance of the governments, international organizations such as the FAO and donor governments in mounting campaigns for their control. Examples being the JP15 and JP28 for the control of rinderpest and CBPP respectively.

108. IBAR maintains close links with the Directors of veterinary services in OAU member States and various international agencies involved in livestock production. Some of these are the FAO, the Office International Epizootique (OIE) USAID, EEC and the International research centres in Africa.

109. IBAR works very closely with FAO in various disease control measures and in the dissemination of animal disease information. It collaborates with the world Reference Laboratory on Foot and mouth disease (FMD) in compiling a quarterly report on the identification of the different strains of the (FMD) virus reported in Africa.

110. IBAR is currently involved with the FAO and OIC in negotiations with the EEC to find funds to mount another joint campaign against rinderpest and CBPP. It is also cooperating with FAO in efforts to control trypanosomiasis and ticks and tick-borne diseases; and to set up subregional development support units for that purpose.

Animal producton

111. In the field of animal production IBAR is involved in the co-ordination of various livestock breeding programmes, concerned with the improvement and preservation of indegenous African livestock breeds. Together with FAO, donor governments ILCA and ILRAD, IBAR is involved in the multiplication, productivity and other studies of trypanotolerant animals especially the N'dama.

Training

112. IBAR is involved with the FAO in organizaing various training programmes in disease control such as trypanosomiasis and ticks and tick borne disease control. The participants include veterinarions, veterniary assistants and technicians. There are also annual joint FAO/OAU leadership training courses.

113. Together with FAO, various joint panels have either been set up or planned to deal with disease and training programmes. Examples being :

(i) Expert panel on animal disease diagnostic laboratories in Africa

(ii) Expert panels on trypanosomiasis

(iii) Expert panel on veterinary education in Africa (Planned)

(iv) Expert panel on animal genetic resources

(v) Expert panel on feed resources (Planned)

114. IBAR maintains a reference library on animal health and animal production. The library also has a collection of reports and publications from ministries dealing with livestock health and production in Africa.

Publication

115. IBAR produces the following publications :

(a) Weekly - IBAR Information Leaflet

(b) Monthly- Animal Disease Statistics for Africa

(c) Quarterly - (i) Bulletin of Animal Health and production in Africa

(ii) Report on types of FMD virus strains and their distribution in Africa

(d) Jointly with FAO/WHO/IEMVT/COPR - Tsetse and trypanosomiasis quarterly.

(e) Annually - (i) Animal disease statistics

(ii) Annual report

(f) IBAR has also published the following maps

(i) Tesetsefly distribution in Africa

(ii) Distribution of Cattle in Africa

(iii) Distribution of Sheep in Africa

(iv) Distribution of Goats in Africa

116. IBAR through its Director, who is currently a member of the Board of Governors of ILRAD, maintains close relationship with ILRAD. IBAR disseminates ILRAD's information to interested African government livestock organizations.

Funding

117. IBAR is funded by the OAU through the STRC.

SUBREGIONAL ORGANIZATIONS

The Southern African Development Co-ordination Conference (SADCC)

118. This is a sub-regional organization grouping the countries of Southern Africa together for the purposes of the development of the sub-region.

Research on animal diseases with the objective of increasing livestock productivity is one of the aims of SADCC. Among the problems being investigated are :

(i) Regional programme for East Coast Fever immunization

(ii) Tick and Tick-borne disease research with the objective of vaccine production

(iii) FMD control and vaccine production

(iv) Integrated Animal Disease control

(v) Control and eradication of Rinderpest

(vi) Animal disease reference laboratory

119. SDCC has plans to carry out these objectives by strengthening laboratories in member countries through seeking donor funds.

The Economic Commission of West African Countries. (ECOWAS)

120. The subregion is desperately short of competent livestock expertise (UN 1980). The work load and financial costs for research are far too exorbitant to be tackled only at national level.

121. There are eight research centres in six of the countries of the region that deal with diseases of livestock. Each of these stations pursues the prolems as seen from the point of view of their respective countries, consistent with available manpower.

122. ECOWAS has taken the decision to set aside funds for research on the control and eradication of African animal trypanosomiasis in collaboration with FAO, WHO and national institutions involved under the auspices of ECOWAS.

NON-GOVERNMENTAL ASSOCIATIONS

123. There are a number of Pan-African sub-regional and national associations involved in the encouragement of scientific, including livestock research and the dissemination of research results. Some of these organizations are:

Pan-African Associations

(i) The Association for the Advancement of Agricultural Sciences in Africa (AAASA);

(ii) Association of Faculties of Agriculture in Africa etc.

Sub-regional Associations

124. These include:

(i) The West African Science Association

(ii) The East African Wildlife Society

The Association for the Advancement of Agricultural Science in Africa

125. The AAASA was founded in 1968 with the support of the Rockfeller Foundation, and has its headquarters at Addis Ababa, Ethiopia. It is an Association of individual scientists in all disciplines which have a bearing on agriculture including animal production and health.

126. The objectives of AAASA are:

(i) To foster the development and application of agricultural sciences throughout Africa;

(ii) To provide for the exchange of experience among scientists and all professionals engaged in agricultural research and production throughout Africa; by means of periodic conferences and meetings and through exchange of publications;

(iii) To encourage Africans to avail themselves of the opportunity to get training in various fields of agricultural sciences; and

(iv) To co-operate with other organizations interested in the steady progress and development of African agriculture.

127. Membership is open to all agricultural scientists in Africa and elsewhere.

128. It publishes a twice yearly journal as an outlet for papers of good profesional standard, agricultural and scientific in content, concerning the development and application of agricultural sciences in Africa. Preference is given to those papers that have a wide significance for African agriculture. Articles include research reports on various veterinary and animal production subjects, from research scientists in universities, and research institutes in Africa.

Association of Faculties of Agriculture in Africa

129. This body founded in 1973 has the following objectives:

(i) To foster the development of agricultural education and research throughout Africa;

(ii) To provide for the exchange, between academic staff of the institutions of higher agricultural education in Africa, of experience and information on all aspects of agricultural education, research and management of the member institutions, by means of periodic conferences, seminars and through the exchange of publications and other documentation

(iii) To evaluate and promote the contribution of member institutions to national and regional development;

(iv) To promote the understanding and improvement of regulations and course structures in member institutions; and

(v) To encourage the exchange of staff and students between institutions of higher agricultural education in Africa.

F. ASSISTANCE OF INTERNATIONAL, INTERGOVERNMENTAL AND REGIONAL AS WELL AS LIVESTOCK RESEARCH ASSOCIATIONS TO NATIONAL INSTITUTES IN AFRICA

130. Assistance as noted earlier assumes various forms from many governments and international agencies some of whom have been named. The forms include

i. Provision of funds for the prosecution of specific research projects,

ii. Award of research contracts to national laboratories,

iii. Attachment of scientists to national research organizations

iv. Provision of research equipment to national laboratories

v. Provision of books and research journals

vi. Training of national research scientists at overseas universities and international research centres in Africa

vii. Training of scientific research managers

viii. Dissemination of scientific information on livestock research through publications, conferences workshops and seminars,

ix. Mobilization of international funds for research,

x. Sponsoring scientist to attend international conferences seminars and workshops

131. There is a fund of goodwill and concern by the various international agencies, governments and associations to assist national research organizations on livestock research and development in Africa. The problems are however so enormous that generous as the assistance given are, the impact is not what is generally expected.

132. Due to economic constraints a number of countries have cut drastically the funding for research including livestock research. There are thus a number of national veterinary diagnostic and research laboratories that are unable to carry out their work properly due as noted earlier to lack of equipment reagents and sometimes staff.

G. HORIZONTAL ASSISTANCE AND CO OPERATION AMONG AFRICAN COUNTRIES TO STIMULATE AND CARRY OUT RESEARCH ACTIVITIES

133. Some pre independence regional research organizations such as the West African Institute of Trypanosomiasis Research (WAITR), the East African Institute for Trypanosomiasis (EAITRO), East African Veterinary Research Organization (EAVRO) have been broken up into national centres. Apart from research scientists meeting at conferences there is not much interaction between the national research centres.

134. There are however national laboratories with facilities for vaccine production, such as those in Dakar, Mogadiscio and Muguga which sell vaccines to those countries needing them.

135. There does not appear to be regular formal meetings of Directors of Veterinary services or of those responsible for livestock research policy. Informal contacts are however made at meetings arranged by the FAO or some other organizations or at conferences.

136 Information hardly flows from one national research organization to the other and there is no forum for bringing Directors of research formally together to discuss research programmes. Except a recent meeting of Directors of Veterinary services from Eastern and Southern Africa in Nairobi, the formal meetings which started IBAR no longer take place.

137. SADCC and ECOWAS have initiated plans to assist each other within their regions as indicated earlier.

H. MAJOR GAPS IN LIVESTOCK RESEARCH

138. To be able to know what gaps exist in livestock research in Africa, one has to have certain information, which includes:

i. The number of livestock research centres,

ii. Their research programmes,

iii. The number of scientists engaged in the programmes and their orientation.

139. Not having been able to obtain such information during the short time at my disposal, I can only offer suggestions. It could be that some of the problems presented here are being actively researched. Suggested areas include animal health, animal production including nutrition, productivity and socio economic studies.

Animal health

140. There are a number of disease problems which frustrate livestock improvement and productivity and deserve more attention than hitherto. These include:

141. Steptothricosis - a debilitating sometimes fatal and economically important disease of cattle, sheep and goats, especially in West Africa. The disease attacks zebus, exotic breeds and their crosses in the humid and sub humid zones of Western Africa from the Gambia to Zaire. Though it has been studied within Africa and elsewhere, no effective preventive or control measures have been found. It has frustrated many expensive attempts at improving both meat and milk production using either pure bred exotic goats and cattle or their crosses with local animals. It ruins the hides of affected animals and limits their exports. Much more vigorous efforts are needed to find a solution to this disease.

142. African swine fever is a rapidly fatal disease of pigs, enzootic in many parts of Africa, causing high mortalities. The exact epizootiology and its distribution are however not quite known. The disease does not appear to receive the attention it deserves in most of Africa.

Diseases of sheep and goats

143. There are a whole lot of disease complexes especially of the respiratory/diarrhoea/hepatitis syndromes which kill a large number of sheep and goats in the humid and the sub humid zones. Though one of these, peste des petits ruminants (PPR) has been identified and a vaccine found for it, yet large numbers of sheep and goats die annually from it. Blue tongue, Nairobi sheep disease, caprine pleuropneumonia, helminthiasis, and coccidiosis also need intensive research.

Other diseases

144. These include Rift Valley fever, demodicosis, lumpy skin disease and poultry diseases.

Ticks and tick borne diseases

1:5. There are a number of tick borne diseases other than those being studied by ILRAD that need investigating.

High mortality among young stock

1:6. It has been variously estimated that between 10 and 30 percent of young stock die before the age of 3 months. The causes of these deaths are many. There is the need to sort out these causes and reduce the deaths to reasonable levels.

Reference laboratories

1:7. There is the need to set up regional reference laboratories for the diagnosis of diseases such as rinderpest, CBPP, FMD etc. Lack of well equipped veterinary diagnostic centres hamper efforts to identify disease problems to allow for research on them.

Animal production

1:8. There are a number of animal production problems that need investigating and improving upon to make livestock production move forward.

(i) improving the milk yield of trypanotolerant stock to enable them to raise and wean their young ones quicker and reduce the intercalving periods of the dams.

(ii). improvement of indigenous stock by selection and multiplication and also to conserve some useful genetic materials they inherantly possess.

(iii) increased production of livestock especially the small ruminants in the humid zones e.g. under plantation crops.

(iv) crop/livestock/fish integration studies.

(v) improvement on traditional methods of meat and milk preservation such as smoking of meat.

(vi) improvement of indigenous small ruminant productivity and their systems of management.

(vii) studies on raising of rabbits and little known meat producing animals such as the grass cutters (T.swinderus) and the forest giant snails (Acatina acatina) in areas where these are acceptable.

(viii) improvement in the detection of heat in indigenous animals to accelerate breeding by artificial insemination.

(ix) studies on modelling of animal production systems.

(x) studies of the economics of the various systems of livestock production.

(xi) involvement of livestock producers in the research process.

(xii) studies on the improvement of livestock marketing

(xiii) studies on the integration of transhumance and shifting cultivation

(xv) studies on pasture improvement and use of agricultural by products as animal feeds.

149. A major gap in livestock research in Africa is the missing link between extension of research results to livestock producers. Studies on the best ways of carrying out this is essential.

150. Studies on the socio-economic constraints limiting or hindering rapid livestock improvement and productivity by the producers is an essential area worth studying and understanding.

H. RECOMMENDATIONS

I. Livestock research institutes/centres

151. In order that livestock research policy makers may avoid unnecessary duplications but devise programmes complementary to each other, and to know what institutions are working on programmes of importance to each country, it is recommended, that

> an inventory of African livestock research centres/institutions indicating their research programmes and staff be published yearly. The Scientific and Technical Research Council (STRC) of the OAU may be called upon to commission this with the assistance of the FAO.

II. Livestock research coordination

152. In order that livestock research centres/institutes may know the achievements of each other and to help identify and rectify gaps in livestock research efforts, for new research directions to be pursued, it is recommended that:

(i) a forum for the meeting of Directors of both national and international livestock research centres/institutes in Africa be organized either yearly or biennially for the exchange of views and ideas.

The ECA and the OAU may call such meetings.

(ii) All livestock research centres/institutes be encouraged to produce their annual reports as early as possible and regularly and make these available to centres/institutes working on similar or complementary programmes.

III. Monitoring of livestock research

153. In order that the research pursued by a national or regional research centre remains relevant to the needs of the country or region concerned, it is recommended that effective means of monitoring the work of such centres and assessing their needs be instituted.

154. Monitoring teams may be set up by the countries for their national centres or a group of countries for regional centres with the help of other research centres or organizations such as IBAR, ECA and FAO.

IV Regional livestock research centres

155. Since a number of countries do not have the resources to set up livestock research centres/institutes to deal effectively with all the problems that need investigating, it is recommended that assistance be given to those national institutes with the necessary infrastructure and resources to become regional livestock research centres to serve the needs of a given area instead of starting new ones, e.g. setting up of regional fodder and seed banks.

V. Strengthening of national research centres

156. A number of national livestock research centres lack either the equipment or manpower to execute their research programmes effectively. It is recommended that these institutions be strengthened by -

(i) secondment of staff; or

(ii) Provision of equipment and spares.

The STFC may be called upon to carry out an inventory with the assistance of IBAR.

VI. Funding of livestock research

157. Funding is one of the major constraints in effective livestock research in national research centres in Africa. It is recommended that efforts should be made to find funds (i) for the topping up of salaries of national research scientists (to retain them) and (ii) for equipment to enable them to work effectively. Donor governments may be asked to fund local staff in some instances instead of seconding their nationals.

VII. Manpower

158. Manpower continues to be a constraint in livestock research in Africa. It is recommended that continued efforts be made to train more personnel, including leadership training for research planners, managers and administrators.

VIII Livestock in the humid and sub-humid zones

159. The humid and sub-humid zones of Africa have potential for livestock production. Though animal trypanosomiasis is a limiting factor to the full utilization of these zones, there are nonetheless some animals like the trypanotolerant cattle and sheep and goats. Some other animals also survive in these zones. It is recommended that attention should be directed to these zones and studies be encouraged to increase meat and livestock production here.

IX. Livestock Extension Services

160. As long as the results of research do not reach livestock producers, the efforts and investments made are to a certain extent wasted. There are a number of research results that do not as yet reach African livestock producers.

It is recommended that livestock extension services be assisted to play a more effective role in the dissemination of results of livestock research.

X. The Inter-African Bureau of Animal Resources

161. The IBAR has hitherto played a very useful role in co-ordinating livestock programmes in disease control, manpower training and encouragement of livestock research.

It is recommended that IBAR be strengthened to enable it to execute the play an even greater role more effectively.

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